

APPLICATIONS SOFTWARE FOR
MICRO/SMALL MINICOMPUTERS

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APPLICATIONS SOFTWARE FOR
MICRO/SMALL MINICOMPUTERS
(PERSONAL COMPUTERS)

Prepared For:
PANAFACOM, LTD.

INPUT LIBRARY

DECEMBER 1980

**APPLICATIONS SOFTWARE FOR
MICRO/SMALL MINICOMPUTERS
(PERSONAL COMPUTERS)**

ABSTRACT

This report analyzes the present state of U.S. development of applications software for small computers and projects future trends. The particular focus of the research is on the high end of the price range of small computer systems for professional or business uses: those selling for \$15,000 or less. Sources of the applications software are identified and strategies for software acquisition are presented.

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I INTRODUCTION



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I INTRODUCTION

A. SCOPE

- A primary objective of this study is to provide basic information to PANAFACOM that will assist them in deciding whether to continue the development of applications software for small computers, purchase this software from the U.S., or do both.
- The particular focus of the research is on the high end of the price range of small computer systems for professional or business uses, selling for \$15,000 or less.
- The U.S. market for packaged applications software for small computers is described and the size of the present market is estimated.
- Sources of the applications software and alternate modes of distribution are identified.
- The present state of U.S. development of applications software for small computers is described and future trends identified.
- Strategies for software vendor evaluation and for software acquisition are presented.

B. METHODOLOGY

- Telephone interviews were conducted with thirty-one companies that distribute packaged applications software for small computer systems.
 - All of the respondents held senior positions with their firms, as shown in Exhibit I-1.
- The respondent profile, annual sales and number of employees, is shown in Exhibit I-2.
 - Nearly all of the firms interviewed are relatively new, reflecting the fact that the industry for packaged applications software is only about two years old.
 - Forty-five percent of the respondents reported annual sales of less than \$500,000.
- All pertinent INPUT research and studies were reviewed and the results used as the basis for many of the sections of this report.
 - A listing of these studies is shown in Appendix B.

EXHIBIT I-1

CORPORATE TITLE OF RESPONDENT-
PERCENTAGE DISTRIBUTION

| PRESIDENT OR PRINCIPAL | VICE PRESIDENT | DIRECTOR OF MARKETING OR OPERATIONS | TOTAL |
|------------------------------|-------------------|--|-------|
| 40% | 25% | 35% | 100% |

NUMBER OF RESPONDENTS = 31

EXHIBIT I-2

RESPONDENT PROFILE - ANNUAL SALES AND NUMBER OF EMPLOYEES

| ANNUAL SALES | | | | NUMBER OF EMPLOYEES | | | |
|--------------|-----------|--------|-------|---------------------|------|-------|-----|
| <\$500K | \$500K-1M | \$1-5M | >\$5M | <5 | 5-10 | 10-50 | >50 |
| 45% | 15% | 25% | 15% | 29% | 18% | 39% | 14% |
| TOTAL = 100% | | | | TOTAL = 100% | | | |

NUMBER OF RESPONDENTS = 31

II EXECUTIVE SUMMARY

II EXECUTIVE SUMMARY

A. MARKET SIZE AND GROWTH

- The first true personal or small computers were introduced in 1977.
- It became apparent to some in 1978 that there was a missing element that was needed to put the small computer into the mass market, namely software.
- Thus, in 1978 there was a very important development, the establishment of the independent software industry for small computing systems.
 - This industry, as it relates to packaged applications software, is the focus of this study.
 - The present market is small, embryonic and scattered, but the potential is high.
- Over 1,200 sources of packaged applications software are listed in industry directories, but only a small number are substantial.
- There are two major sources of applications software today:
 - Equipment vendors.

- The less than twenty successful independent software vendors that were founded in the 1978 timeframe.
- The two most financially successful independent software vendors are:
 - Personal Software, who is heavily involved in applications software.
 - Microsoft, primarily involved in systems software (BASIC), now turning to applications software as well.
- The principal applications offered now are the traditional ones:
 - Accounting.
 - Inventory management.
 - Word processing.
 - Mailing lists.
- Growing rapidly in importance are the applications aimed at executive desktops, for:
 - Business analysis.
 - Planning and forecasting.
 - Graphic presentation of data.
- Few scientific and engineering applications are yet available.
- Educational software is just beginning to appear.
- Entertainment programs are selling as strongly as ever.

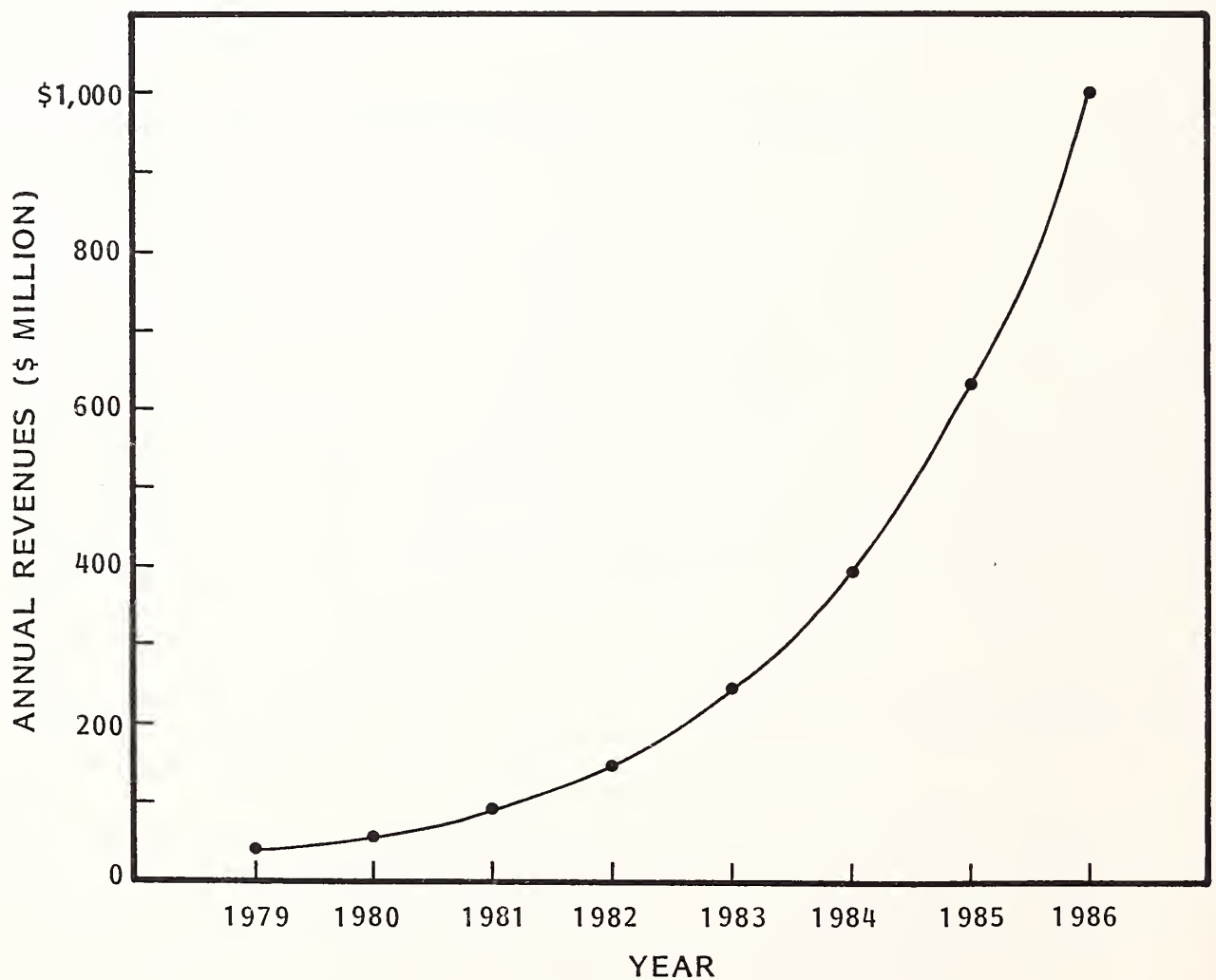
- Sixty percent of the respondents in this study are currently supplying packaged applications software for small computers to world markets.
 - It is rather surprising that the vendors are this active outside of the U.S.; on the average, they are deriving 15% of total revenues from foreign markets.
- Two unpenetrated business markets are particularly attractive:
 - Sale of small computers to the 11 million middle managers in large U.S. corporations.
 - Sale of small computers to first-time users in the nearly 2 million small U.S. companies that are prime candidates for automation.
- INPUT estimates that the applications software market for small computers in the U.S. was \$40 million in 1979 and that it will reach \$60 million in 1980.
 - With an expected average annual growth rate (AAGR) of 60%, the market is expected to reach \$1 billion by 1986.
 - INPUT's market forecast is shown in Exhibit II-1.

B. MODES OF DISTRIBUTION

- The first small computers were sold by direct mail and at specialized trade shows. Although very successful initially, once the first surge of interest from engineers and other technically sophisticated computer hobbyists had been satisfied, this approach quickly faded as the primary method of selling these systems.

EXHIBIT II-1

APPLICATIONS SOFTWARE FOR SMALL COMPUTER SYSTEMS IN THE U.S.
1979-1986 -
MARKET FORECAST



AAGR = 60%

- Today, the primary ways by which small computers are sold can be classified into seven categories, as shown in Exhibit II-2.
- About two years ago several startups and subsidiaries of established companies entered the business of marketing software for small computers, the beginning of the independent software industry.
 - These companies are now an important force in the market and are growing rapidly.
 - The most successful of these companies with respect to packaged applications software is Personal Software, whose sales have tripled over the last year, reaching a level of over \$3 million per year.
- Many software companies are small, single-location firms with limited marketing capabilities. Software brokers lend valuable assistance to these companies in the sale and distribution of software.
- Computer user groups can provide sources of software from among their membership.
 - This source can be particularly valuable for extremely specialized applications software.
- Remote computing services (RCS) companies are relatively new in the packaged applications software business.
 - RCS vendors' interest, however, is centered on minicomputers or mainframes; they have very little involvement with small computers.
 - They represent a market opportunity for small computer software vendors because much of the transaction processing business will migrate to the small computer.

EXHIBIT II-2

MODES OF DISTRIBUTION OF APPLICATIONS SOFTWARE FOR SMALL COMPUTER SYSTEMS

- SOFTWARE COMPANIES
- SOFTWARE BROKERS
- USER GROUPS
- SERVICES COMPANIES
- TURNKEY SYSTEMS COMPANIES
- COMPUTER STORES
- MANUFACTURERS

- Even today, the information analysis software available for small computers is surprisingly powerful and very suitable to business planning.
- Packaged applications software vendors generally recognize that turnkey systems, in their microprocessor form, will be a major factor in the software market.
 - However, only about 15% of major applications software vendors are making efforts to develop turnkey systems for this market.
- Computer stores have become the most important distribution channel for applications software.
 - These specialty retail outlets can be owned independently, owned and operated by the major computer manufacturers (including IBM and DEC), or franchises operating as a part of a local or national chain of stores.
 - Major retailers like Sears and Montgomery Ward have also entered the business.
 - Other major office equipment manufacturers, such as Xerox, have also opened retail outlets that sell small computers.
- Most of the small computer manufacturers offer packaged applications software for their computers.
 - Present applications are mostly for accounting and mailing lists.
- The present status in the industry and expected future directions of the various modes of distribution are shown in Exhibit II-3.

EXHIBIT II-3

MODES OF DISTRIBUTION -
PRESENT STATUS AND EXPECTED FUTURE DIRECTION

| MODE OF DISTRIBUTION | PRESENT STATUS | FUTURE DIRECTION |
|---------------------------|--------------------------------|--------------------------------|
| SOFTWARE COMPANIES | SMALL BUT EMBRYONIC | EXPLOSIVE GROWTH |
| SOFTWARE BROKERS | SMALL - SPECIALIZED MARKETING | NOT AN IMPORTANT FACTOR |
| USER GROUPS | SMALL - SPECIALIZED PROGRAMS | NOT AN IMPORTANT FACTOR |
| SERVICES COMPANIES | SMALL - DESIRE TO ENTER MARKET | NOT EXPECTED TO BE COMPETITIVE |
| TURNKEY SYSTEMS COMPANIES | SMALL | WILL BE COMING UP |
| COMPUTER STORES | IMPORTANT FACTOR | RAPID GROWTH |
| EQUIPMENT MANUFACTURERS | IMPORTANT FACTOR | RAPID GROWTH |

- Clearly, the most important modes of distribution of applications software today, and for the future, are:
 - . Computer stores.
 - . Equipment manufacturers.
- Independent software companies are presently suppliers to computer stores and equipment manufacturers.
 - Although growth of the independent software companies will be largely dependent upon distribution through computer stores and equipment manufacturers, the software companies are expected to sell directly to end users in the future as well by means of direct sales representatives heavily supported by advertising and promotion.

C. VENDOR EVALUATION

- Vendor evaluation must be carefully considered in the context of a rapidly emerging, but presently embryonic, software industry where future events are unknown.
- The first step is to define requirements carefully, including:
 - Technical.
 - Target markets.
 - Number of vendors desired.
 - Need for custom programming.

- Maintenance and enhancements.
- Type of vendor.
- The following are the most important criteria for evaluating potential software vendors.
 - Experience.
 - Size.
 - Customer base.
 - Profitability.
 - Primary markets.
 - Service organizations.
 - References.

D. FUTURE ISSUES

- The increasing ability of small computers to be networked will make many new applications possible by having access to data bases, and by distributed processing.
- The number of packaged applications programs will grow very rapidly, and will be primarily aimed at the requirements of both large and small offices.
- Equipment development employing 16 bit microprocessors will spark a great deal of software development.

- More high level programming languages are expected.
- Improved information storage and retrieval systems will become available.

E. ACQUISITION OF APPLICATIONS SOFTWARE

- Outright purchase of packaged software products, including title to the products, is far preferable to licensing arrangements, for both PANAFACOM and the software vendor, if both parties can reach agreement on the product value.
- The timing is right for corporate acquisition of small independent software companies, which would be an attractive way to acquire the software.
- License agreements are usually non-exclusive rights to distribute the software products. The agreements can take many forms, such as:
 - Payment of a fixed fee for each unit sale (an O.E.M agreement).
 - Royalty payments based on a percentage of sales.
 - Licensing agreement with a purchase option.
- Contracts and negotiations for software acquisition include the following:
 - Purchase and lease terms.
 - Installation.
 - Maintenance and enhancements.
 - Modifications.

- Financial liability.
- Title.
- Items to be delivered.
- Schedules.

F. RECOMMENDATIONS

- PANAFACOM should seek to acquire U.S. packaged applications software as a major source of supply.
 - Very little packaged applications software is presently available that has been specifically designed to take advantage of 16 bit machines.
 - Future studies should be especially sensitive to 16 bit packages and to the vendors that are capable of handling such developments.
- Engage in further detailed study in order to define the requirements for selection of a software vendor(s), including:
 - Technical requirements.
 - Target markets.
 - Number of vendors required.
 - Type of vendors required.
 - Program modifications to meet international market requirements.

- Need for custom programming.
- Tradeoffs between software license, software purchase or corporate acquisition.
- Evaluate potential vendors by sequential steps, as follows:
 - Identify the top 10-20 candidates.
 - Reduce the final candidates to five or less.
 - Negotiate for program licenses.
 - Negotiate for program purchase.
 - Negotiate for possible corporate acquisition(s).
- Consideration should be given to entering the U.S. market in order to exploit the major opportunities available over the next few years. This should include:
 - Offering turnkey systems with U.S. software.
 - Offer U.S. versions of Japanese-developed software.

III MARKET SIZE, SEGMENTATION AND GROWTH

III MARKET SIZE, SEGMENTATION AND GROWTH

A. AN OVERVIEW

- Small computer systems or personal computers are, by INPUT's definition, computer systems selling for \$15,000 or less.
 - The focus of this market study is for this class machine.
- The first hobby computers were introduced in 1975, and the first small computer systems were introduced in 1977.
 - Commodore introduced its Personal Electronic Transactor (PET).
 - Heath entered personal computing with its H8 and H11 systems.
 - Radio Shack brought out its TRS-80.
 - The Apple II was introduced.
 - Large companies like DEC, Texas Instruments and Mattel soon followed.

- The installed base of small computer systems reached 400,000 units by the end of 1979 and has an estimated potential of reaching nearly two million installations by the end of 1985.
- It became apparent to some in 1978 that there was a missing element needed to put the small computer into the mass market, namely software.
 - Comments by William Gates, President of Microsoft, a leading company in software for small computer systems are shown in Exhibit III-1.
 - Software is the key missing element.
- In 1978, Personal Software and a number of other companies were founded with the goal of taking the expertise of small computer users, packaging the software professionally and distributing the products through mass distribution channels.
- This was an important development, the establishment of the independent software industry for small computer systems.
 - This industry, as it relates to packaged applications software, is the focus of this study.
- The present market is embryonic, scattered and small; but the potential is huge.
 - As the user base of small computer systems grows, companies like Radio Shack may well make as much money selling software as they do selling the initial product itself.
- The key point in terms of advancing the state-of-the-art is that the software is going to bridge the gap between unsophisticated users and increasingly sophisticated hardware.

EXHIBIT III-1

IMPORTANCE OF SOFTWARE

"SOFTWARE DEFINES THE PERSONAL COMPUTER."*

"IT IS THE MAJOR MISSING ELEMENT NEEDED FOR WIDE-
SPREAD CONSUMER ACCEPTANCE AND APPLICATION OF
MICRO-ELECTRONIC INTELLIGENCE."*

*QUOTE FROM WILLIAM GATES, PRESIDENT, MICROSOFT

B. SOURCES OF PACKAGED APPLICATIONS SOFTWARE

- The number of U.S. companies or groups who claim to be distributing packaged applications software for small computers is very large. A listing by type of vendor is shown in Exhibit III-2.
 - Over 1,200 sources are included in industry directories.
- INPUT believes this listing of 1,200 sources is somewhat misleading because of the very limited product that is presently available. A more useful picture is:
 - Almost all equipment vendors now offer applications software.
 - With very few exceptions, these packages were developed by others and purchased or licensed by the manufacturers.
 - Less than 20 software vendors, such as Personal Software and Microsoft, are currently successful.
 - The independent software vendors as a group, however, are likely to be the most important future source of software.
- An illuminating result of the interview program for this study is that 80% of the calls made to potential software suppliers were nonproductive.
 - Either the party was out of business, the telephone was disconnected, an answering service represented an individual "moonlighting" in software development, or some other similar reason.
 - This is graphic evidence of the present status of a new, scattered market, but one of great potential.

EXHIBIT III-2

NUMBER OF U.S. COMPANIES OR GROUPS
DISTRIBUTING PACKAGED APPLICATIONS
SOFTWARE FOR SMALL COMPUTERS

| TYPE OF VENDOR OR GROUP | APPROXIMATE NUMBER |
|--|-----------------------|
| SYSTEM VENDORS AND STORES | 300 |
| SOFTWARE VENDORS | 700 |
| USER GROUPS, CLUBS AND ASSOCIATIONS | 230 |
| TOTAL | 1,230 |

C. STATE OF DEVELOPMENT IN APPLICATIONS SOFTWARE

- The principal applications offered now, to a new category of small business with under ten employees, are the traditional ones of:
 - Accounting.
 - Inventory management.
 - Word processing.
 - Handling of mailing lists..
- Growing rapidly in importance are the applications aimed at middle managers in larger companies, for example:
 - Business analysis.
 - Planning and forecasting.
 - Graphic presentation of data.
- Few scientific and engineering applications are yet available.
- Educational software is just beginning to appear.
- Entertainment programs are still selling as strongly as ever.
 - It seems even professionals like to play games on their computers.
- The availability of good applications software is rapidly dispelling the widespread belief that small computers are not good for anything serious, that for most applications you need a large minicomputer or a mainframe.

- Surveys have identified the principal applications desired by users. Exhibit III-3 shows these ranked in order of importance.
 - Note that word processing, service bureaus and transaction processing are ranked among the top ten; applications that previously were regarded as requiring minicomputers or mainframes.
- Although applications outside of the accounting areas are very sparse at present, INPUT research has identified a wide range of applications now beginning to appear on the market. A listing is shown in Exhibit III-4.
 - These new applications are expected to be a very important factor in the future expansion of the small computer market.

D. ACTIVITIES OF THE VENDORS IN OVERSEAS MARKETS

- Sixty percent of the respondents in this study are currently supplying packaged applications software for small computers to foreign markets. The world markets these software vendors are supplying are shown in Exhibits III-5 and III-6.
 - On the average, these vendors are deriving 15% of revenues from foreign markets.
 - These range as high as 75% of revenues in the case of one vendor with a worldwide distribution network.
 - Three quarters of the vendors stated that they would consider licensing their software to foreign manufacturers.
 - These indications show a high degree of vendor interest in licensing, should PANAFACOM wish to obtain U.S. software.

EXHIBIT III-3

PRINCIPAL APPLICATIONS IN ORDER OF IMPORTANCE

1. ACCOUNTING
2. PAYROLL/PERSONNEL
3. MANUFACTURING
4. WORD PROCESSING
5. SERVICE BUREAUS
6. ENGINEERING/SCIENTIFIC
7. TRANSACTION PROCESSING
8. EDUCATION
9. GOVERNMENT
10. DISTRIBUTED PROCESSING

EXHIBIT III-4

CURRENT U.S. OFFERINGS OF PACKAGED
APPLICATIONS SOFTWARE FOR SMALL COMPUTERS -
GENERAL CATEGORIES

- ACCOUNTING
- BANKING AND FINANCE
- COMPUTER MANAGEMENT AIDS
- DATA COMMUNICATIONS
- DATA AND DATA BASE MANAGEMENT
- EDUCATION
- ENERGY CONSERVATION AND MANAGEMENT
- ENGINEERING AND SCIENTIFIC
- ENTERTAINMENT
- FACILITIES, SECURITY AND PROTECTION
- GOVERNMENT
- INSURANCE
- LEGAL
- MANAGEMENT SCIENCES
- MANUFACTURING
- MATHEMATICS AND STATISTICS
- MEDIA (PUBLISHING, BROADCASTING, ETC.)
- MEDICAL AND HEALTH CARE
- PAYROLL AND PERSONNEL
- SALES AND DISTRIBUTION
- TRANSPORTATION
- WORD PROCESSING AND TEXT EDITING

EXHIBIT III-5

OVERSEAS MARKETS IN WHICH RESPONDENTS ARE CURRENTLY
DISTRIBUTING PACKAGED APPLICATIONS SOFTWARE

| LOCATION | PERCENT OF RESPON- DENTS |
|---------------|-----------------------------------|
| EUROPE | 43% |
| JAPAN | 23 |
| SOUTH AMERICA | 20 |
| MIDDLE EAST | 14 |
| TOTAL | 100% |

EXHIBIT III-6

OTHER INTERNATIONAL MARKETS WHICH RECEIVED
MULTIPLE MENTIONS

- AUSTRALIA
- CANADA
- HONG KONG
- SOUTH AFRICA
- CHINA
- SINGAPORE
- MEXICO

- The most prevalent methods of marketing overseas are selling directly from the U.S. and by using foreign distributors, as shown in Exhibit III-7.
 - The vendors are generally too new, and too small to be able to open foreign offices.
- Special problems associated with distributing applications software packages internationally were identified by the respondents and are shown in Exhibit III-8.
 - Problems associated with lack of standardization and with poor communications are of general concern.
 - Vendors are particularly concerned with protecting themselves from unauthorized duplication and bootleg distribution of their programs.
 - This is a difficult problem in the U.S. market also, but copyright laws are of some help. Comments on software protection in the U.S. were identified by previous INPUT research and are shown in Exhibit III-9.
 - In international markets, vendors see no solution, and this is likely to be a key issue in arranging for rights to U.S. software.

E. MARKET SIZE AND GROWTH

- The market for packaged applications software for small computers is embryonic today, but it will experience explosive growth.
- Two unpenetrated business markets offer particularly attractive opportunities for small computers, and the associated applications software packages:

EXHIBIT III-7

HOW RESPONDENTS MARKET THEIR
PRODUCTS OUTSIDE OF THE U.S.

| DISTRIBUTION METHOD | PERCENT RESPONSE |
|----------------------------------|---------------------|
| SELL FROM U.S. ONLY | 43% |
| USE A FOREIGN DISTRIBUTOR | 39 |
| HAVE FOREIGN OFFICES | 9 |
| RIGHTS SOLD TO A FOREIGN FIRM | 9 |

NUMBER OF RESPONSES = 23

EXHIBIT III-8

SPECIAL PROBLEMS IN DISTRIBUTING APPLICATIONS SOFTWARE INTERNATIONALLY, AS IDENTIFIED BY RESPONDENTS

- DUPLICATION AND BOOTLEG DISTRIBUTION
- LACK OF STANDARDIZATION
- LANGUAGE AND GEOGRAPHICAL PROBLEMS
- LAG IN PAYMENT

EXHIBIT III-9

COMMENTS ON SOFTWARE PROTECTION IN THE U.S.

- "NONE"
- "DON'T WORRY ABOUT IT"
- "COPYRIGHT LAWS"
- "UNIQUE LANGUAGE"
- "SOPHISTICATED PROTECTION - BUILT IN ERASING"
- "NOT ECONOMICALLY FEASIBLE"
- "MACHINE LANGUAGE SERIAL NUMBER CHECK"
- "LICENSE AGREEMENT"
- "DON'T TRY"
- "LOW PRICE AND HOPE"
- "PROTECTED BY MANUFACTURER"

- Sale of small computers to the 11 million middle managers in large U.S. corporations.
- Sale of small computers to first-time users in the nearly two million small U.S. companies that are prime candidates for computer automation.
- The installed base of small computer systems in the U.S. is around 400,000.
 - It will continue to grow rapidly if the necessary packaged applications software is made available.
- INPUT estimates that the U.S. market for packaged applications software for small computers was \$40 million in 1979, and that it will reach \$60 million in 1980.
 - Seventy-five percent of these sales are expected to be made by retail stores of various kinds.
 - OEM sales have been increasing in importance, while direct sales have been decreasing.
- The market is expected to grow at 60% per year (average growth in 1980 among respondents was 100%) and is expected to reach \$1 billion by 1986.
- The 1979 market for applications software for small computers was less than 5% of the applications software market for all size computers.
 - This relationship is shown in perspective in Exhibit III-10.
 - The small computer market is expected to increase as a percent of the total market by capturing applications now running on the larger machines and on computer services.

EXHIBIT III-10

APPLICATIONS SOFTWARE EXPENDITURES
BY TYPE OF COMPUTER, 1979

| HARDWARE MANUFACTURER | SIZE OF HARDWARE | | |
|--------------------------|------------------|---------------------|-----------------|
| | LARGE >\$350K | MEDIUM \$15-350K | SMALL <\$15K |
| BURROUGHS | \$ 35MM | \$ 8M | \$ 0M |
| COMPUTER AUTOMATION | 0 | 15 | 0 |
| DATA GENERAL | 0 | 30 | 0 |
| DEC | 6 | 80 | 0 |
| HEWLETT-PACKARD | 0 | 20 | 1 |
| HONEYWELL | 18 | 6 | 0 |
| IBM | 510 | 33 | 4 |
| NCR | 13 | 8 | 0 |
| TEXAS INSTRUMENTS | 0 | 15 | 1 |
| UNIVAC | 16 | 5 | 0 |
| OTHER | 0 | 40 | 34 |
| TOTAL | \$598M | \$260M | \$40M |

IV MODES OF SOFTWARE DISTRIBUTION

IV MODES OF SOFTWARE DISTRIBUTION

A. INTRODUCTION

- Methods used by respondents to distribute packaged applications software in the U.S. market were ranked in order of importance. The results are shown in Exhibit IV-1.
 - The general practice is to sell through distributors; i.e., retail stores of one kind or another, heavily supported by advertising and direct mail.
 - Although O.E.M. agreements were ranked fifth, other INPUT research shows O.E.M.s are increasing in importance and direct sales are decreasing in importance.
- The most successful of the new breed of software vendors is Microsoft, who has built its business to date almost entirely by means of O.E.M. sales.
- The list of Microsoft's O.E.M. customers for systems software is shown in Exhibit IV-2. It clearly demonstrates the effectiveness of O.E.M. business for a successful company.
 - A number of respondents had tried to make arrangements with computer manufacturers for distribution of packaged applications software, but none were successful.

EXHIBIT IV-1

METHODS USED BY RESPONDENTS TO DISTRIBUTE PACKAGED
APPLICATIONS SOFTWARE IN THE U.S. MARKET -
RANKED IN ORDER OF IMPORTANCE

| RANKING | METHOD |
|---------|--------------------------|
| 1 | ADVERTISING |
| 2 | DISTRIBUTOR |
| 3 | DIRECT MAIL |
| 4 | DIRECT SALES |
| 5 | O. E. M. |
| 6 | COMPUTER MANUFACTURER |

EXHIBIT IV-2

IMPORTANCE OF OEM DISTRIBUTION

"MICROSOFT PROVIDES STANDARD SYSTEMS SOFTWARE USED BY THE MAJORITY OF PERSONAL COMPUTER AND WORD PROCESSOR MANUFACTURERS":*

| | | |
|-----------|-----------------|-------------------|
| ADDS | LEXITRON | PERTEC |
| AMDS | MAGNAVOX | PHILIPS |
| APPLE | MATSUSHITA | RADIO SHACK |
| BEEHIVE | MATTEL | RICOH |
| COMMODORE | MOSTEK | ROCKWELL |
| CROMEMCO | NATIONAL SEMI | SIEMENS |
| HEATH | NCR | SYNERTEK |
| HITACHI | NEC | TEKTRONIX |
| ICL | OHIO SCIENTIFIC | TEXAS INSTRUMENTS |
| INTEL | OKI | XEROX |

*QUOTE: WILLIAM GATES, PRESIDENT, MICROSOFT

B. MODES OF DISTRIBUTION

I. SOFTWARE COMPANIES

- About two years ago, several startups and subsidiaries of established companies entered the business of marketing software for small computers.
- Since that time there have not been many new entries. In fact, there has been some attrition among software companies, with GRT Corporation, Aladdin and PRS apparently out of business or at least inactive.
- The survivors have generally built their businesses and expanded their product lines over the last year.
 - A listing of these vendors is shown in Exhibit IV-3.
 - The most successful of these companies with respect to applications software is Personal Software, whose sales have tripled over the last year.
 - Many of these vendors are expected to focus future development on business applications.
- The lack of new entrants over the past year is due to the lack of available channels and companies are now adequate to bring to market most of the really worthwhile software that has been produced. Also the cost of reaching the marketplace continues to rise.
 - This year Personal Software will spend over \$1 million on marketing and distribution, not counting what their distributors and dealers will spend.

EXHIBIT IV-3

SOFTWARE DEVELOPERS/MARKETERS AND PRODUCT AREAS

| SOFTWARE MARKETERS | PRODUCT AREAS |
|-------------------------|-----------------------|
| CREATIVE COMPUTING | GAMES, EDUCATION |
| HAYDEN BOOKS | GAMES, EDUCATION |
| INSTANT SOFTWARE | VARIOUS, MOSTLY GAMES |
| LIFEBOAT ASSOCIATES | SYSTEM SOFTWARE |
| PERSONAL SOFTWARE | GAMES, DESKTOP TOOLS |
| ACT PETSOFT (U.K.) | GAMES |
| PROGRAMMA INTERNATIONAL | VARIOUS, MOSTLY GAMES |
| SOFTAPE | GAMES |

EXHIBIT IV-3 (CONT.)

SOFTWARE DEVELOPERS/
MARKETERS AND PRODUCT AREAS

| SOFTWARE DEVELOPERS/ MARKETERS | PRODUCT AREAS |
|---|---|
| DIGITAL RESEARCH MICROPRO INTERNATIONAL MICROSOFT MUSE OSBORNE & ASSOCIATES PEACHTREE SOFTWARE STRUCTURED SYSTEMS GROUP TECHNICAL SYSTEMS CONSULTANTS | SYSTEM SOFTWARE WORD PROCESSING MOSTLY SYSTEM SOFTWARE GAMES, WORD PROCESSING ACCOUNTING (BOOKS) ACCOUNTING ACCOUNTING SYSTEM SOFTWARE |

- Those who wish to produce software for small computers find it more advantageous to go to the computer manufacturers or to companies like Personal Software than to set up their own marketing and distribution.
- Some of the software companies are packaging their software products with hardware to produce turnkey systems.
- Fifteen percent of the respondents in this study offer turnkey systems.

2. SOFTWARE BROKERS

- Many software companies are small, single-location firms with limited marketing capabilities.
- Software brokers lend valuable assistance to the small software company in the sale and distribution of software.
- Some software brokers are fully staffed to install and support the products they sell and to train the user's personnel.
- The quality of products sold by brokers can vary widely, so prospective purchasers of software need to review their offerings carefully.

3. USER GROUPS

- Computer user groups can provide sources of software from among their membership.
- This source can be particularly valuable for extremely specialized applications software, since software companies may have little to offer such a small market.

- This source can also be fraught with above-average risks in that the software has usually been developed for a single specific user. Thus, the needs of other users may not have been considered in its design.
- The quality of documentation and level of support provided for software developed by users are poorer generally than those for products produced by software houses.
- These packages often have very few users and consequently have not really undergone the tests of the marketplace.
- Software packages developed by users are usually inexpensive and may be worth their cost. However, low-cost software can be difficult to use, difficult to install, have operational "bugs," etc.

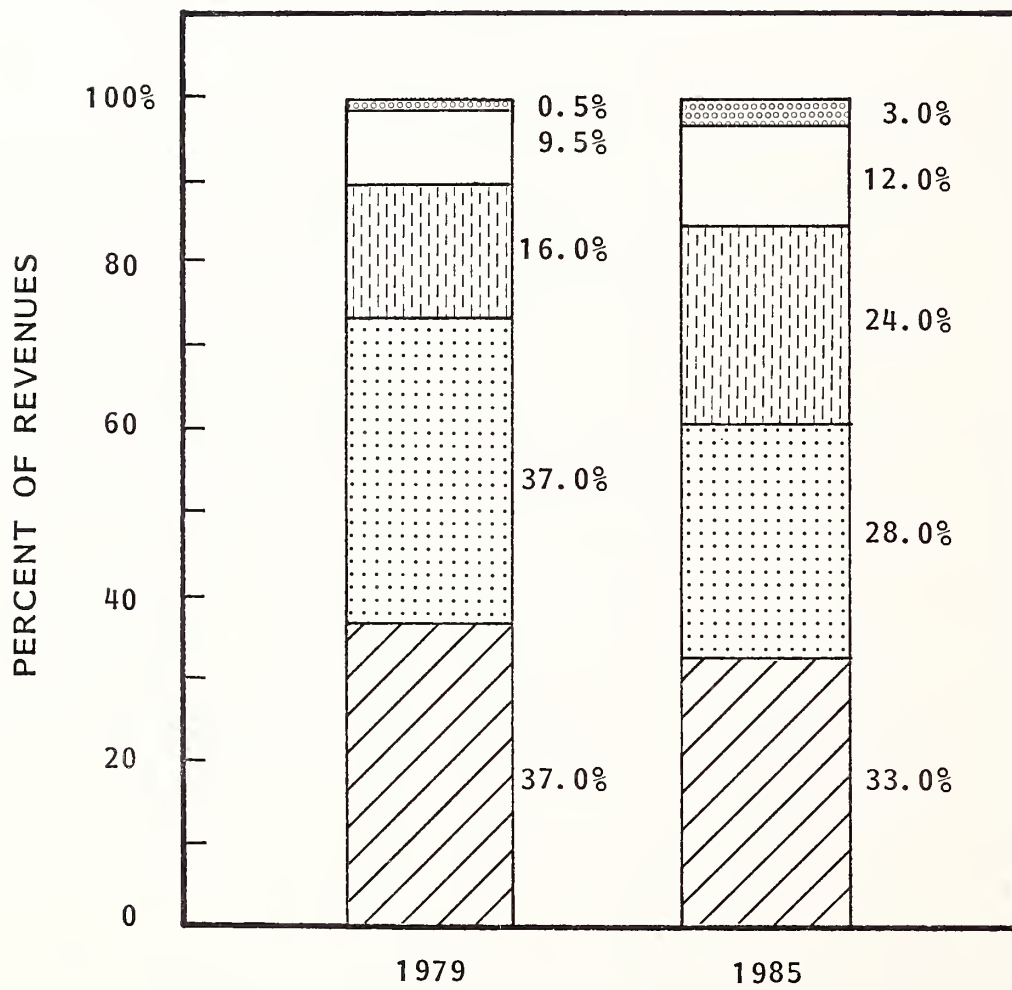
4. SERVICES COMPANIES






- Remote computing services (RCS) companies are relatively new in the packaged software business.
- Many RCS vendors are selling their software as a part of either a turnkey system or a user site hardware service (USHS).
- Some of their software is available in an unbundled package, either:
 - Directly from the RCS company.
 - From a third party who originally developed the software and licensed it for resale to the RCS company.
- RCS vendors are also generally very strong in the areas of documentation, training and support.

- RCS vendors' interest in packaged software is centered on larger mini-computers or mainframes.
 - There is not a significant involvement of RCS vendors with small computers.
- There are, however, significant trends in RCS vendor revenue distribution by application type that afford a considerable market opportunity for vendors of small computers and vendors of the associated packaged applications software.
 - These trends were identified in previous INPUT research and are shown in Exhibit IV-4.
 - The major implication of significance to the small computer field is the sizeable reduction in RCS revenues for information analysis.
 - Information analysis applications will move from the remote computing environment to small computer systems.
- "Information analysis" generally involves:
 - Converting data into information through the use of mathematical, statistical or financial analysis tools.
 - Providing for easy display of the results in report or graphic form.
 - The ability to address a variety of nonrepetitive problems via rapidly adaptable tools.
 - A common business use for financial, marketing and statistical analysis.
 - Scientific and engineering techniques and applications.

EXHIBIT IV-4

RCS VENDORS' REVENUE DISTRIBUTION BY APPLICATION TYPE, 1979-1985



-  TRANSACTION PROCESSING
-  INFORMATION ANALYSIS
-  DATA BASE MANAGEMENT
-  PROCESSING APPLICATIONS
-  INQUIRY

- RCS vendors of raw computer power, who sell processing services which perform information analysis on an individual basis are most vulnerable to the small computer competition.
 - Research shows that use of these services will decline as a share of total revenue in the RCS industry by nearly 30% in the next five years.
 - As processing, storage and software capability increase in the 1980s, small computing systems will be able to address more and more information analysis needs.
- "Bond yields" serve as an example of the trend in information analysis.
 - In the early 1960s, financial analysts computed bond yields by extrapolation from yield tables generated by batch processing systems.
 - By the late 1960s, investment bankers were using remote computing services to perform this analysis. A typical large bond dealer would spend \$5,000 a month calculating the yields on bonds.
 - By the early 1970s, several manufacturers introduced small computers, some of which could be set on the top of a desk, which could perform the same calculations but in far greater volume.
 - In the late 1970s, this same analysis could be performed on a pocket calculator that cost less than \$100.
- In the meantime, the remote computing services companies went on to bigger and more complex problems involving information analysis.
 - This usage is still high, accounting for approximately 37% of the 1979 processing services reported by our respondents.

- However, a decline will be inevitable in the 1980s as desktop computers are introduced with over a million bytes of memory at a total purchase price approaching what many RCS users are accustomed to spending each month.
- Even today, the information analysis packaged software available for small computers is surprisingly powerful and very suitable to business planning applications.
- Visicalc, offered by Personal Software on the Apple and Radio Shack small computers has already demonstrated tremendous success in this area.

5. TURNKEY SYSTEMS COMPANIES

- A "turnkey system" is defined as an integrated hardware/software package which is supplied to the user by a single vendor.
- Packaged applications software vendors generally recognize that turnkey systems, in their microprocessor form, will be a major factor in the software market.
- However, only about 15% of major applications software vendors are making efforts to develop turnkey systems.
- Although most vendors are enthusiastic about the positive impact of microcomputers on their business and are actively developing software to run on microcomputers, few vendors are interested in packaging their products into turnkey products.
- Some of the reasons for the reluctance of vendors to enter the turnkey applications business are:
 - The burden required to provide support for the hardware.

- The additional effort required to sell turnkey solutions.
- General complication of the sales cycle due to hardware-oriented concerns of the customer.
- However, the markets for manufacturing, accounting and human resources packaged applications software contain many applications which are well suited for turnkey systems.
- Turnkey systems have major appeal to small, first-time users who desire basic systems to automate their operations.

6. COMPUTER STORES

- Computer stores are becoming very valuable sources of packaged applications software.
- A listing of computer stores is shown in Exhibit IV-5.
 - These specialty retail outlets can be owned independently, owned and run by major computer manufacturers, or franchises operating as a part of a local or national chain of stores.
 - Generally these stores will employ sales persons with considerable expertise to help customers determine uses for small computers, and to help assemble an appropriate configuration of hardware and software.
 - Most computer companies are keenly aware of the potential business opportunity that small computers represent.
 - IBM, DEC and CDC have already started to open their own retail stores.

EXHIBIT IV-5

COMPUTER STORES

- DEC
- XEROX
- CONTROL DATA CORP.
- IBM
- ZENITH
- COMMODORE
- RADIO SHACK (TANDY)
- COMPUTERLAND
- BYTE SHOPS
- THE COMPUTER STORE
- COMPAL

- IBM has also opened about 70 "showroom" locations nationwide where their smaller systems can be observed, tested and purchased in some of their branch offices.
- General merchandise department stores such as Sears, Penney's and Montgomery Ward have entered the small computer market.
 - They sell either popular small computers or private label versions of these brands.
- Maintenance is performed in some way by all of the stores.
 - The hobby-oriented stores try to confine their maintenance work to in-store maintenance.
 - The business-oriented stores are almost exactly the opposite in their approach to maintenance. Almost all of them will perform on-site maintenance while only half provide in-store maintenance.
- Maintenance can be paid for in three general ways:
 - Under warranty.
 - Monthly contract.
 - Time and material charges.
- All of the stores will do warranty work and almost all will work on monthly contracts as well as time and materials arrangements.
- The usual maintenance contract is written for 1% of the purchase price of the system per month.

- From INPUT's other studies in the computer services area, in computer usage in small establishments, and in value added network services, customer training was deemed second only to equipment maintenance in its importance to the ultimate user. While training may be of less consequence to the hobbyist user of computer systems, it is almost certainly of great importance to the business user.
- It is in this training area that the computer stores, both business- as well as hobbyist-oriented, show the greatest lack in terms of providing customer support.

7. MANUFACTURERS

- Most of the small computer manufacturers offer packaged applications software for their computers. Listings of software packages offered by selected small computer vendors are shown in Exhibits IV-6 through IV-10.
 - Accounting and mailing applications are well covered and are best typified by the Radio Shack offerings.
- Non-accounting applications are rare, but some are beginning to appear. A listing is shown in Exhibit IV-11.
 - The most advanced scientific and engineering programs are offered by Hewlett-Packard.
 - Non-accounting applications are expected to be the most important factor in the future market for packaged applications software.

EXHIBIT IV-6

PACKAGED APPLICATIONS SOFTWARE FOR SMALL COMPUTERS CURRENTLY OFFERED BY APPLE COMPUTER

| APPLICATIONS SOFTWARE | PRICE |
|---|-----------------------------------|
| <p>COMPUTER: APPLE II</p> <ul style="list-style-type: none"> ACCOUNTING: GENERAL BUSINESS SYSTEM I RETAILING: POINT OF SALE STOCK MARKET | <p>\$625</p> <p>250</p> <p>50</p> |
| <p>COMPUTER: APPLE III</p> <ul style="list-style-type: none"> INFORMATION ANALYST WORD PROCESSING | <p>BUNDLED</p> <p>BUNDLED</p> |

EXHIBIT IV-7

PACKAGED APPLICATIONS SOFTWARE
FOR SMALL COMPUTERS
CURRENTLY OFFERED BY
HEWLETT-PACKARD

| APPLICATIONS SOFTWARE | PRICE |
|---|--------------------------------|
| STATISTICAL AND ANALYTICAL SOFTWARE PACKAGES | RANGE FROM \$200 TO \$2,000 |

COMPUTER: SYSTEM 45; MODEL 45B

EXHIBIT IV-8

PACKAGED APPLICATIONS SOFTWARE FOR
SMALL COMPUTERS
CURRENTLY OFFERED BY IBM

| APPLICATIONS SOFTWARE | PRICE |
|--|-----------------------------|
| <ul style="list-style-type: none">● ACCOUNTING<ul style="list-style-type: none">- COMMERCIAL BUSINESS- GENERAL BUSINESS- JOB LABOR COSTING | RANGE FROM \$60 TO \$300 |

COMPUTER: IBM-5120

EXHIBIT IV-9

PACKAGED APPLICATIONS SOFTWARE FOR
SMALL COMPUTERS CURRENTLY OFFERED BY
RADIO SHACK (TANDY CORPORATION)

| APPLICATIONS SOFTWARE | PRICE |
|-------------------------------|----------|
| ● GENERAL LEDGER | \$199 |
| ● ACCOUNTS RECEIVABLE/PAYABLE | 299 EACH |
| ● 3 DISK VERSION | 499 EACH |
| ● PAYROLL | 399 |
| ● INVENTORY MANAGEMENT | 199 |
| ● WORD PROCESSING | 299 |
| ● MAILING LIST | 79 |

COMPUTER: TRX-80 MODEL II

EXHIBIT IV-10

PACKAGED APPLICATIONS SOFTWARE FOR
SMALL COMPUTERS CURRENTLY OFFERED BY
TEXAS INSTRUMENTS

| APPLICATIONS SOFTWARE | PRICE |
|---|---------------|
| <ul style="list-style-type: none">• NONE OFFERED DIRECTLY BY TEXAS INSTRUMENTS; SOFTWARE PACKAGES PROVIDED BY OEM'S OR END USERS. | NOT AVAILABLE |

COMPUTER: TI-DS 990, MODEL I AND MODEL II

EXHIBIT IV-11

NON-ACCOUNTING
PACKAGED APPLICATIONS SOFTWARE
CURRENTLY OFFERED BY
SELECTED SMALL COMPUTER VENDORS

APPLICATIONS SOFTWARE

- ENGINEERING CIRCUIT ANALYSIS PROGRAM
- WAVE FORM ANALYSIS
- GENERAL STATISTICS
- REGRESSION ANALYSIS
- LINEAR PROGRAMMING
- BASIC STATISTICS
- DATA MANIPULATION
- FINANCE
- TEXT EDITING
- BASIC TRAINING
- GAMES

V SOFTWARE VENDOR EVALUATION

V SOFTWARE VENDOR EVALUATION

A. EMERGING INDUSTRY

- In choosing a U.S. vendor, or vendors, as a source of applications software, PANAFACOM must carefully consider the selection of potential candidates in the context of the present state of the industry.
 - The independent software industry for small computers is only two years old.
 - It is embryonic and scattered, but the industry is seen as the key to the development of the entire industry for small computers, and is certain to be the focus of enormous attention.
 - This state of affairs presents both problems and opportunities:
 - Problems, because the future events in the industry itself must be considered in selecting potential vendors.
 - Opportunities, because its rapid growth will bring many new products to the market and careful selection of these will produce large rewards in terms of market penetration in the small computer field.

- Only an outline of the approach to vendor selection can be presented in this report, but the subject deserves further in-depth study.

B. DEFINING REQUIREMENTS

- The key first step is for PANAFACOM to define requirements that must be satisfied by the software vendor.
- Defining the requirements must include the following:
 - Technical requirements with respect to program languages and machine characteristics.
 - Target markets in three categories:
 - Japan, U.S. or worldwide.
 - Business, scientific, engineering, education or other.
 - Large corporations, small corporations, private users.
 - Can requirements be met by one vendor or should arrangements be made with multiple vendors?
 - What modifications to the U.S. programs are required for international markets?
 - Will packaged applications programs be sufficient or will custom programming be required as well?
 - Needs for enhancement, maintenance and support.

- Identify the type of vendors that best meet market needs.
 - . Computer manufacturer.
 - . Independent software developer.
 - . Independent software distributor.
 - . Other.

C. CRITERIA FOR VENDOR EVALUATION

1. GENERAL

- Vendor evaluation is made more difficult by the newness and rapidly changing characteristics of the industry; however, many of the traditional yardsticks apply. Steps involved and criteria for evaluation are discussed in the following sections.

2. EXPERIENCE

- The experience a vendor has should be evaluated in several ways, including:
 - The amount of time a vendor has been in the software business.
 - The amount of time a vendor has sold the particular package.
 - The experience of the principals prior to entering the software business.

3. SIZE

- Generally, larger organizations should rank higher than smaller ones.

- If an organization has more than a million dollars in annual revenue or more than 20 employees, it is probably satisfactory.

4. CUSTOMER BASE

- A large customer base is desirable in a vendor.
- It is good when a vendor can provide a list of reference customers using the software product.
- The number of customers should be evaluated with respect to the total number of potential users. A highly specialized industry package will have a much smaller market.

5. PROFITABILITY

- Vendors should have demonstrated financial stability.
- The continued useful life of a software product is dependent upon the vendor's ability to continuously enhance and maintain it, which to some extent is dependent upon a positive cash flow.
- If the vendor is not a public company (most are not) and the software package requires a substantial financial commitment, one should request copies of audited financial statements.

6. PRIMARY MARKETS

- Vendors should be evaluated on the basis of their commitment to the software business.
- Higher ratings should be given to a vendor primarily dependent on software sales as opposed to one for which it is only a peripheral line of business.

- A software product is more favorable if it is the premier or principal product of the vendor.
- If the product is an industry application specialty product, the level of commitment the vendor has towards that industry segment should be examined.

7. SERVICE ORGANIZATION

- The level of competence that the vendor can provide in support of the package should be rated.
 - Generally a staff (even one person) dedicated to the support of a single product is better than one individual supporting a variety of software products.
 - A dedicated headquarters support staff is also important, as long as it is accessible.

8. REFERENCES

- It is very important that references of users of the product be requested and randomly checked.
- Installations similar to the one for which the software is being bought should be visited.
- A list of at least five questions should be compiled (to ask other users) which address key concerns regarding the software package and the vendor.
- References should be requested and checked only when there is a serious interest in executing an agreement. They should be used primarily to verify and validate the results of the vendor evaluations.

VI FUTURE ISSUES - TRENDS AND DIRECTIONS

VI FUTURE ISSUES - TRENDS AND DIRECTIONS

- The increasing ability of small computers to be connected with one another, and to larger computer systems by communications networks, will be a very significant development during the next few years.
 - This will make it possible to communicate with large computerized data banks, making many new applications possible.
- The inventory of packaged applications programs will grow very rapidly.
 - Many of the new applications will be graphics-supported and will utilize color displays.
 - The bulk of new applications will be for non-entertainment purposes for business and home.
 - Menu-driven business applications will be used for many tasks in both large and small offices.
- The current trend toward business applications will accelerate over the next few years.
- Voice recognition devices and speech synthesizers will increase in sophistication and will be supported in much of the applications program development work currently being planned.

- Equipment development employing 16 bit microprocessors and employing up to 10 million bytes of memory will spark a great deal of software development.
- More high-level programming languages such as COBOL and PASCAL are expected.
- New information storage and retrieval software systems, such as data base management and user inquiry systems, will become available in the next few years.

VII ACQUISITION OF APPLICATIONS SOFTWARE

VII ACQUISITION OF APPLICATIONS SOFTWARE

A. DEVELOP OR ACQUIRE

- PANAFACOM's internal development of applications software has several advantages.
 - Proximity and knowledge of the domestic Japanese market allows for tailoring the software packages more specifically to meet user needs than a U.S. firm would be able to do.
 - Complete control of distribution of the software would be maintained.
 - Maintenance and enhancement would be done locally.
- Disadvantages of internal development would be:
 - Requires an initial outlay of funds to support the development effort.
 - Would take much longer, perhaps a matter of years, to reach the marketplace.
 - Reaching the U.S. marketplace would be much more difficult.

- Particular important, it would not allow taking advantage of the large and varied packaged applications software now available in the U.S., nor the software advancements that will come in the next few years from the rapidly expanding market.

B. ALTERNATE METHODS OF ACQUISITION

I. PURCHASE

- Outright purchase of packaged software products, including title to the products, is far preferable to licensing for both PANAFACOM and the software vendor.
 - This is because purchase avoids the risk/rewards conflicts that are potential problems between the contracting parties in a license agreement.
 - Purchase agreements, however, are often hard to arrange because of the difficulty of getting both parties to agree to a product value.
 - Purchase also has more inherent risks to PANAFACOM because of the higher initial investment required.

2. CORPORATE ACQUISITION OR JOINT VENTURE

- Another way to achieve the benefits of product ownership is by means of corporate acquisition or joint venture.
 - The timing for acquisition of independent software vendors is right, because the industry is only two years old and there are many small vendors vying for the market.

- The vendors need capital for expansion.
- There are certain to be a large number of such acquisitions in the next few years, as large firms try to satisfy their appetites for quality packaged applications software.
- Some industry observers feel there will be few, if any, independent software vendors remaining by the end of this decade.

3. LICENSE

- License agreements or royalty arrangements are usually non-exclusive rights to distribute the packaged applications software.
- Payment of a fixed fee to the vendor for each unit sale is probably the next preferred arrangement.
 - Under such an arrangement the fee should vary in accordance with the number of units installed.
 - In effect, this would be an O.E.M. arrangement including an O.E.M. discount schedule.
- Another arrangement would be a royalty agreement with payment based on a percentage of revenues.
 - This is a common arrangement but it has inherent conflicts between the two contracting parties.
 - If prices go down, the vendor will feel that the deal was unfair.
 - If prices go up, the buyer will feel that the vendor is not entitled to any increase in revenue because there was no increase in product value.

- . If the buyer makes product enhancements, the vendor may receive increased royalty revenue even though the vendor had nothing to do with those enhancements.
- Licensing agreements may include purchase options.
- It is important that a licensing agreement provide for PANAFACOM to own complete rights for the sale of the software, without payment of royalties after a certain level of payments to the vendor (e.g., equal to the development costs of the package) has been reached.
- One major advantage of the licensing approach is that it makes it much easier to acquire an inventory of software from multiple vendors.

C. CONTRACTS AND NEGOTIATIONS

I. PURCHASE AND LEASE TERMS

- When packaged software is licensed, the "buyer" is usually paying for the right to distribute the product.
 - This form of "sale" protects the vendor's title to the product.
 - The license also allows the vendor to exercise some control over distribution of the product since he retains title to the product.
- There are many variations to be considered in deciding on an appropriate means of acquisition of software. This entire area is deserving of further in-depth study.

2. TECHNICAL SUPPORT

- The vendor's responsibilities, if any, for providing support should be spelled out in the contract.
- Penalties should be provided in the contract for incomplete support of the product when the vendor is responsible.
- The amount and kind of support and training should be defined in the contract.
 - It should include a description of the qualifications of the personnel who will provide the support.

3. MAINTENANCE AND ENHANCEMENTS

- The product should carry a warranty for at least one year.
 - Procedures for correcting errors after installation should be provided.
 - A minimum response time for finding errors should also be defined.

4. MODIFICATIONS

- Any modifications the vendor has agreed to should be included in the contract in detail, with due dates.
- If PANAFACOM intends to modify the package, they should be sure the modifications do not invalidate any warranties or maintenance agreements.

5. FINANCIAL LIABILITY

- The vendor should assume financial liability if the product fails to perform as warranted and specified.

6. TITLE

- Vendors should guarantee that the product is proprietary and that the product will be defended against any infringement claims involving trademarks, trade secrets or patents.
- Vendors will expect PANAFACOM to protect vendor trade secrets as if these trade secrets were PANAFACOM's own, and not to reproduce unlawfully materials the vendor supplied.

7. OTHER FACTORS

- The contract should incorporate all relevant sales literature into the agreement as referenced attachments.
- The vendor company may request the right to assign lease payments to another organization, but it should not be allowed to assign its obligations under the agreement without approval.
- The contract should define what the vendor is going to deliver, including:
 - Decks of cards.
 - Tapes.
 - Source documents.
 - Documentation.
 - User guides.
 - Training.

APPENDIX A: DATA BASE

EXHIBIT A-1

RESPONDENT PROFILE - ANNUAL SALES AND NUMBER OF EMPLOYEES

| ANNUAL SALES | | | | NUMBER OF EMPLOYEES | | | |
|--------------|-----------|--------|-------|---------------------|------|-------|-----|
| <\$500K | \$500K-1M | \$1-5M | >\$5M | <5 | 5-10 | 10-50 | >50 |
| 45% | 15% | 25% | 15% | 29% | 18% | 39% | 14% |
| TOTAL = 100% | | | | TOTAL = 100% | | | |

NUMBER OF RESPONDENTS = 31

EXHIBIT A-2

CORPORATE TITLE OF RESPONDENT -
PERCENTAGE DISTRIBUTION

| PRESIDENT OR PRINCIPAL | VICE PRESIDENT | DIRECTOR OF MARKETING OR OPERATIONS | TOTAL |
|------------------------------|-------------------|--|-------|
| 40% | 25% | 35% | 100% |

NUMBER OF RESPONDENTS = 31

APPENDIX B: RELATED INPUT REPORTS

APPENDIX B

RELATED INPUT REPORTS

- OPPORTUNITIES IN MARKETING APPLICATIONS SOFTWARE PRODUCTS -
DECEMBER 1980
- TRENDS IN DELIVERY OF REMOTE COMPUTING SERVICES -
NOVEMBER 1980
- ECONOMICS OF PACKAGED SOFTWARE
OCTOBER 1980
- SELLING PERSONAL COMPUTERS TO LARGE CORPORATIONS -
VOLUME I ANALYSIS OF USER REQUIREMENTS
VOLUME II MARKET FORECASTS AND PRODUCT STRATEGIES
SEPTEMBER 1980
- TURNKEY SYSTEM OPPORTUNITIES, 1979 - 1984
JANUARY 1980
- VENDOR STORES
AUGUST 1979

APPENDIX C: CATALOG OF MICRO/SMALL
MINICOMPUTER SYSTEMS

APPENDIX C: CATALOG OF MICRO/SMALL MINICOMPUTER SYSTEMS

A. APPLE COMPUTER, INC.

10260 Bandley Drive
Cupertino, CA 95014
(408) 996-1010

1. BACKGROUND

- Apple Computer, Inc., was founded in 1976. In 1977 the company introduced its Apple II system, which had been sold (until early this year) primarily through independent distributors, franchises and a small number of company-owned stores.
- Its acquisition of Compushop in March 1980 increased its warehousing facilities from one (located in Sunnyvale, CA) to three (adding facilities in Richardson, TX and Charlotte, NC).

2. CURRENT PRODUCTS

- Introduced in 1977, the Apple II replaced the initial system, which had been designed primarily for the hobbyist market. The maximum selling price remained below the \$2,000 level until the 1979 announcement of Apple II Plus, with an extended BASIC in ROM. The enhancement alone did not increase the price, but it allowed optional packages, such as Applesoft II, a firmware card

with Auto-Start in ROM to be added, thus making turnkey software resident in ROM available to the user once the APPLE II was turned on.

3. FUTURE PRODUCTS

- The Apple III, a small business computer system, was unveiled at this year's NCC at Anaheim, CA. Demonstration units were installed in Apple dealers and franchise stores by June 1980. Initial delivery of the Apple III is not expected before the third quarter this year.
- The unit, based on a 6502A microprocessor, offers up to twice as much ROM (96K) as its predecessor. A 96K unit, including a black and white monitor and software designed for professional and management-level users, is expected to sell at a price of about \$4,400. Another unit designed for word processing applications will be priced from \$5,400 to \$7,800.
- The company can be expected to offer a great deal more software over the next two to five years, and will probably approach the business market segments with communications capabilities for office-of-the-future usage.

B. BURROUGHS CORPORATION

World Headquarters
Burroughs Place
Detroit, MI 48232
(313) 972-7000

I. BACKGROUND

- The Burroughs Small Systems Group engineers and manufactures small- and very small-scale computer systems and business minicomputers as well as standalone workstations, document management systems and data preparation equipment. The Small Systems Group has four manufacturing facilities in the U.S. and two in Scotland.

- The Program Products Division is responsible for the development of line-of-business applications software. The OEM division provides additional marketing assistance to the Small Systems Group.

2. CURRENT PRODUCTS

- While Burroughs does not have a configured system that falls below the \$15,000 price ceiling set for this study, its B90 series, which includes the B91 and the B92, is targeted at the low end of the minicomputer marketplace, with a minimum configuration priced slightly less than \$18,000.

3. FUTURE PRODUCTS

- Assuming that hardware prices continue to decline, a minimally configured B91 will easily fall below the \$15,000 price ceiling within the next two years. Since all software pricing is unbundled, the minimum hardware price today can be expected to include an operating system by 1982.
- In addition, Burroughs can soon be expected to announce a freestanding business system at or below the \$15,000 level to be used as a management workstation.
- The company currently approaches the large-company market with direct salespeople. This approach will probably continue unless either the cost of manufacturing or the cost of sales rises dramatically for the company over the next two to five years.

C. DATA GENERAL CORPORATION

Route 9
Westboro, MA 01581
(617) 366-8911

1. BACKGROUND

- Since 1969, Data General has shipped more than 75,000 computer systems. In 1979, Business Week ranked Data General first out of 683 major U.S. computer companies surveyed on the basis of the portion of revenues invested in research and development. The company maintains more than 80 field sales offices in the U.S., six field sales offices in Canada and more than 70 overseas.

2. CURRENT PRODUCTS

- Data General was the first minicomputer manufacturer to design computer hardware and software systems that were totally compatible and expandable. The configurations mentioned in this profile all incorporate the 6031 single diskette subsystem, the 6052 CRT and the 6043 Receive-Only printer. Each of the following systems can be configured with these peripherals at a cost of \$15,000 or less. (Note that the cost of software is not included.)

- CS/20 64K - \$13,145*.
- Nova 3/4 - 32K - \$13,590*.
- Nova 3/12 - 32K - \$14,590*.
- Nova 4/C - 32K - \$9,890; 64K - \$10,590*.
- Nova 4/S - 32K - \$12,890; 64K - \$13,490*.

*Prices are approximate

3. FUTURE PRODUCTS

- Data General currently places heavy emphasis on the distributed network capability of its entire family of systems. The company foresees a shift in its markets from inquiry/response and data base applications to dedicated mini-computer networks operating independently from host processors.
- Due to the variety of user requirements for languages, discrete applications and continuance of data sharing, the company is aiming its development efforts at software. The company believes that modular software that is easy to use, maintain and modify is the key to success in dedicated, no-host minicomputer networks.
- The very fact that the company stresses the importance of networking and software suggests that Data General is aiming future products at end-users in larger companies. While the company talks about dedicated systems, little of its software is designed for use by specific end users or user departments.

D. DATAPOINT CORPORATION

9725 Datapoint Drive
San Antonio, TX 78284
(512) 699-7151

I. BACKGROUND

- Datapoint was incorporated in 1968 as Computer Terminal Corporation. Its first product, the 3000 Series interactive CRT, was introduced the following year. In 1972 the company changed its name to Datapoint to reflect the broader scope of business first demonstrated by its successful introduction of the Datapoint 2200 dispersed processing system in 1971.

- The company marketed its products primarily through distributors until it established its own direct sales force in early 1979. Today, Datapoint has more than 50 sales offices in the U.S. and more than 25 sales representatives in other countries. TRW Datacom-International, Inc. (of Los Angeles and Isleworth, Middlesex, England), is the company's master distributor for international sales.

2. CURRENT PRODUCTS

- Datapoint now has a family of II compatible dispersed data processors. The company's ARC system - introduced in 1978 - allows total integration of any of the II Datapoint processors.
- While most of the company's systems can be used as standalone workstations, two - the 1500 and the 1800 - are priced at less than \$15,000 in minimum configurations.
 - The 1500 is priced at \$5,950 with a 32K processor, screen, keyboard and diskette data storage; it can be upgraded to 60K, built-in communications and 1 MB disk storage.
 - An 1800 with 60K user memory, keyboard, 80 x 24 video display screen, 4 MB dual-drive diskette and communications interface is priced at \$12,500.

3. FUTURE PRODUCTS

- Datapoint has energetically promoted the integration of word processing, data processing and communications as well as the use of electronic mail and message systems. The company is in a solid position to approach large-company managerial and professional individuals and departments for its existing product lines. With low-end products such as the 1500 and 1800 systems (both of which are field-upgradable as the user's requirements grow) and the company's image as a leader in network systems, this position will not easily be disturbed.

E. DIGITAL EQUIPMENT CORPORATION

146 Main Street
Maynard, MA 01754
(617) 897-5111

1. BACKGROUND

- Digital Equipment Corporation was founded in 1957. Its first Programmed Data Processor (PDP), the PDP-1, a high-speed, 18-bit small computer with 32K of addressable core memory, was delivered in December 1959 at a price of \$120,000. PDP-2 and PDP-3 prototypes never reached the production stage.
- The first PDP-4 was delivered in 1962 with slower memory at a price of \$65,000.
- The PDP-5 has been acknowledged as the first commercially available business minicomputer. The 12-bit machine (the forerunner of the PDP-8) was introduced in 1963.
- The PDP-8 was announced in 1965 just as the competition introduced systems comparable in price/performance to the PDP-5.

2. CURRENT PRODUCTS

- Digital has since announced the PDP-9, -10 and -11 series, as well as the PDP-12 and PDP-14 in 1968 and 1969 respectively. There are several DEC minicomputers that can be configured as complete freestanding workstations, which include (prices are approximations):
 - PDP-8/E - (8K CPU) tape drive, CRT and 30 cps printer - \$14,865.
 - PDP - 11/03 - (16K + dual floppy disk, DECWRITER II) - \$10,000.
 - Datasystem 150 (32K) - \$10,900 or (60K user memory) \$11,600.

- DECstation 78/40B - \$7,995; 78/70D - \$12,400 (both 16K).
- DECstation 88/50-D (32K) - \$11,500, includes VT-100 CRT (88/50-L costs the same, but with LA180 printer added - \$14,400).

3. FUTURE PRODUCTS

- DEC approaches large companies on a departmental level through its OEMs. The primary focus remains on direct sales. Individual sales to managers and professionals are handled through DEC stores. DEC has a large but fragmented software base which it must protect, and from which it can draw when approaching departmental users.

F. HEWLETT-PACKARD
 Desktop Computer Division
 3404 East Harmony Road
 Fort Collins, CO 80525
 (303) 226-3800

1. BACKGROUND

- Hewlett-Packard's Desktop Computer Division is responsible for the 9800 series, including all of the products described in this profile. The company is a leading manufacturer of laboratory test equipment, analytical instrumentation, and data processing equipment.
- The company's products are sold by more than 125 sales offices in over 35 countries worldwide. Its desktop computers made their debut with the introduction of the HP 9831 in March 1977, an outgrowth of the 9800 series calculators.

2. CURRENT PRODUCTS

- Hewlett-Packard has five low-end minicomputer systems that sell in minimum configurations for less than \$15,000. HP desktop computers are designed for three broad markets: scientific, business and data acquisition.
- The company supplies software applications packages for each system that allow a user to perform sales analysis, computation for inventory control, matrix mathematics, statistical analysis, accounts receivables, structural analysis and computer graphics.
- They also provide a programming education package for those wishing to write their own programs.
- The HP-85 is designed for business and/or scientific applications; it is priced at \$3,250 for the 16K version and \$3,645 for the 32K version.
- The HP-45 is primarily intended for business analysis. This 64K machine includes a 24-line CRT and is priced at \$12,500 in a minimum configuration.
- The HP-35 is available with a single-line display for data acquisition control, at a price of \$8,700 for the 64K system. With a full CRT display for scientific applications, the price rises to \$9,900 for the 64K system.

3. FUTURE PRODUCTS

- Neither the HP-85 nor the HP 9800 series desktop computers are upgradable to the company's larger minicomputer systems. With the utilization of one of three communications interfaces, they can be attached to an HP network.
- While programs are not specifically designed for downloading to the desktop lines, data can be accessed. Although the desktop models cannot be considered distributed data processing network nodes, they do have their place in the large company environment, generally in technical applications.

- The company is making a greater effort to provide applications packages for other business-oriented disciplines as noted earlier. The promotional literature for the newer HP-85 is a case in point. Illustrations of the system's graphics capabilities portray market research forecasts and sales performance charts as opposed to the heavy scientific emphasis in brochures for earlier product lines.
- Hewlett-Packard's direct sales force is in a good position to penetrate business-oriented user departments within the large companies that have already accepted the company's scientific-oriented desktop systems as well as its larger business minicomputer systems.

G. INTERNATIONAL BUSINESS MACHINES CORPORATION

General Systems Division
4111 Northside Parkway
Post Office Box 2150
Atlanta, GA 30301

I. BACKGROUND

- IBM entered the market for minicomputer systems with the November 1976 announcement of the Series/1. When first introduced, the Series/1 was offered with minimal systems software and virtually no applications software. IBM has since made over 73 software and 20 hardware announcements. Users' reactions to the Series/1 and other IBM minicomputer systems have been quite favorable.

2. CURRENT PRODUCTS

- Series/1 minicomputers are offered in component fashion. Depending on the processor selected, a user can configure a vast array of peripheral products to build a system for any specified need. A minimum 16K configuration with diskette, 20 x 84 display and keyboard can be priced as low as \$12,400.

- IBM 5110 systems replaced the earlier 5100 system. The 5110 is available in 16K, 32K, 48K and 64K versions. Each is also offered with either APL or BASIC languages or both. The desktop unit includes the keyboard, a 204K built-in tape cassette and a built-in 5" CRT. Prices range from \$9,875 for a 16K, single-language version to \$17,125 for a two-language, 64K system. A separate option is the 5103 printer, which is priced at \$3,200 for the 80 cps model, and \$3,700 for the 120 cps model.
- The IBM 5120 is an updated version of the 5110, with a 9" display, detached keyboard and two built-in 2.4 MB diskette drives. Like the 5110, it is offered with either APL or BASIC or both. Prices range from \$9,160 for the 16K MOSFET memory, single-language model, up to \$13,175 for the 64K MOSFET memory, dual-language version.

3. FUTURE PRODUCTS

- With its 5120, IBM is finally approaching departmental users with a total package that can be specifically configured to fit the narrower application needs of large companies. IBM's literature is careful to state that the application depicted in the brochure is typical of that being performed on IBM systems, but does not necessarily represent a product that is currently available from the company.
- The BRADS II (Business Report/Application Development System II) is a set of specialized tools that allow non-programmers to enter, store and sort information on the 5120, to design reports, develop applications, and re-use the data available from the IBM 5120 accounting applications. The BRADS II provides the flexibility needed to build applications for various departments such as sales, personnel, financial planning, accounting, production and security services.

H. TANDY CORPORATION

P.O. Box 2932
Fort Worth, TX 76101
(817) 390-3700

I. BACKGROUND

- The Tandy Corporation acquired Radio Shack in 1963 as part of an integrated strategy aimed at a profit center concept of operations little used in retail merchandising. Through Radio Shack, the company introduced its TRS-80 in August 1977. The merchandising expertise of the Tandy Corporation coupled with the talents of Radio Shack dealers provided the main stimulus for the skyrocketing of the new product; initially designed for personal and hobbyist uses, the general business public was quick to realize potential benefit in small, standalone applications.

2. CURRENT PRODUCTS

- The TRS-80 is available in two discrete models. The Model I is the low-end of the product line. The Model II is designed primarily for business and professional users. The TRS-80 Model I is a 4K system that uses cassette tape for external storage, priced at \$499. With the addition of the expansion interface, the TRS-80 can be expanded to 64K.
- The TRS-80 Model II is available in a 32K configuration for \$3,450. It can be expanded to 64K with a memory add-on priced at \$499. The current top-of-the-line Model II, "Deluxe 2 Megabyte Business System," is priced at \$8,737 and includes a 64K CPU, 3 disks, a desk, Line Printer III and stand, and a 12-inch B & W monitor.

3. FUTURE PRODUCTS

- In January 1980, Tandy made two significant announcements; the first alerted the public to the availability of annual maintenance contracts, and the second was the establishment of the Tandy leasing subsidiary. In keeping with users'

proclivities to bring TRS-80s to work, the company moved to assure the success of such endeavors.

- Tandy is also in the process of setting up OEM relationships around the country for systems referred to as Tandy rather than Radio Shack computers. Combined with last year's establishment of more than 50 computer repair centers in the U.S., the company is aiming directly at the large- and small-company markets for very small computers. Reports of extensive software developmental efforts currently underway also lend support to their solid competitive position for the next five to ten years.

I. TEKTRONIX INCORPORATED

Information Display Group

P.O. Box 500

Beaverton, OR 97077

(503) 638-3411

I. BACKGROUND

- In 1946, Tektronix introduced the world's first commercially available oscilloscope. The company maintains over 47 field offices for sales and service of its more than 700 products for U.S. markets.
- The company is a corporate-resident of 17 foreign countries, providing sales and service to more than 60 nations. The company is one of the foremost leaders in the design and manufacture of graphics terminals and, more recently, complete standalone computer graphics systems.

2. CURRENT PRODUCTS

- Tektronix entered the field of desktop, microprocessor-based systems in October 1975 with the introduction of its 4051 Graphic Computing System. The 4051 was originally priced at \$6,995 for an 8K CPU, a storage-cube

graphic display, keyboard and magnetic tape cartridge unit all housed in a desktop cabinet.

- At that time, the 4051 could expand to a maximum of 24K. With associated peripheral additions, the high-end price was \$16,300. Today the basic 8K configuration is priced at \$5,995, expandable to 32K for an additional \$1,900.
- The 4051 intelligent terminal mode now also permits data sharing with a host computer at up to 2400 baud.
- Tektronix has also introduced the 4052 with a standard 32K CPU that can be expanded to 64K. The standalone unit can optionally be provided with an asynchronous communications interface capable of terminal mode operation at up to 9600 baud.
- The 4052 is low-end priced at \$9,800. A 64K version, including the 9600 baud communications interface, is priced at \$13,200.

3. FUTURE PRODUCTS

- The company is heavily committed to providing state-of-the-art computerized graphic systems as well as displays and other graphics-related peripherals. The company has targetted the technical (i.e., scientific and engineering) user in companies of all sizes as its market.
- There is no indication that the company has saturated this market potential, and there is no significant reason for it not to continue in this vein. For this reason, it is unlikely that business professionals and non-technical business managers in large companies will be pursued during the next five years.

J. TEXAS INSTRUMENTS INCORPORATED

Digital Systems Division
P.O. Box 1444
Houston, TX 77001
(512) 258-5121

I. BACKGROUND

- Texas Instruments is primarily known as a leading manufacturer of semiconductor products for the electronics industry. The company also manufactures a broad line of process control equipment, instrumentation, digital watches and calculator products, and computer peripheral equipment.
- With the shipment to date of more than 225,000 data terminals, the company has gained a broad base of experience in marketing to large companies, both to DP departments and end users. Its computer systems first hit the market in 1974.

2. CURRENT PRODUCTS

- Texas Instruments announced the 16-bit TI 980B general-purpose scientific minicomputer with options from 16K to 128K bytes of internal storage in the first quarter of 1974. A minimum standalone configuration priced at \$10,470 would include the 8K word CPU plus an 8K memory add-on module, and the 733 ASR twin-cassette Silent 700 Data Terminal Kit, which includes the terminal and interface.
- The TI 990 series was first introduced in October 1975. The first fully configured 990 product for less than \$15,000 is the FS 990/4, which is priced at \$14,045 in single-unit quantities, and is marketed primarily to OEMs.

- In early 1979, the company announced two new models in the 990 series: the Model 1, which is a desktop, single-user system for data entry and/or standalone business applications; and the Model 2, which is a multi-user system available in either desktop or cabinet enclosures.
 - The Model 1 is based on the TI TMS 9900 microprocessor. It contains a standard 64K byte main memory, CRT console and two diskette drives, and is fitted with 2 EIA asynchronous ports. The Model 1 is priced at \$9,450.
- The Model 2, priced at \$13,200, is based on the newly announced 990/5 processor. The multi-user system price includes 64K bytes of main memory, 2 CRT terminals, diskettes and asynchronous ports. An internal printer priced at \$1,100 is also available for the Model 1.
- The 99/4, Texas Instruments' personal computer selling for about \$1,000 without a printer, is just beginning to be used in the large business environment. A unique approach to building an applications base is available within the TI system product lines. Application programs can be written on the 990 series in any of the available languages, and burned into a ROM chip, which can then be used on the 99/4. Existing applications programs can be modified to fit the 99/4 facilities and then burned into a chip.

3. FUTURE PRODUCTS

- Texas Instruments has not announced expansion of the 99/4 product line due to its slow acceptance in the home market. As the large company market grows, it can be expected to broaden this product line and to develop an integrated marketing approach to large companies designed around all of its product lines.

- With an estimated installed base for terminals in excess of 200,000, and an excellent distributor network, Texas Instruments is certainly in a good position to convert business users to very small computer systems capable of retaining communications with host systems.

K. WANG LABORATORIES, INC.

One Industrial Drive
Lowell, MA 01851
(617) 851-4111

I. BACKGROUND

- WANG Labs, one of the first companies to manufacture and market programmable calculators in the U.S. market, is currently a forerunner in the manufacture and sale of small and very small computer systems to the large-company marketplace. The company's "Integrated Information Systems" approach underlies the success of its efforts.
- The emphasis that WANG places on integrating technologies to accommodate word processing, telecommunications and data processing capabilities into a single system allows its sales force to approach any large company at various levels.

2. CURRENT PRODUCTS

- WANG manufactures and markets several systems based on its 2200T micro-processor. Initially called the 2200 series, WANG's systems range from \$4,800 to \$13,300.
- The PCS-II, which was priced at \$4,800, included a CRT with rebuilt keyboard, the 2200T processor and a minidiskette.

- The PCS-III is priced from \$6,500 to \$10,500 and replaces the PCS-II.
- The WCS-15, also based on the 2200T processor, includes a CRT with an in-built keyboard and two 256K diskettes. It is priced at \$12,500 with 24K main memory and at \$13,300 with 32K main memory.
- WANG's SVP uses 16K to 64K main memory, and is priced from \$12,000 to \$20,000 depending on the peripherals included.
- The MP and LVP systems are priced above the \$15,000 ceiling considered in this study, but these systems are also based on the 2200T processor.
- A user can upgrade an SVP system to the higher performance system with the addition of memory modules, interface hardware and appropriate systems software.
- WANG's VS systems are not based on the 2200T, and users cannot grow 2200 systems into VS systems. VS system prices start above \$20,000.

3. FUTURE PRODUCTS

- WANG systems, despite the company's novel approach to the market, are primarily viewed as word processors (at least at the low end of the product line). This image actually acts in the company's favor.
- While many vendors of mini- and microsystems are having difficulty identifying specific "data processing" applications within large companies for their products, WANG has pursued the line of least resistance: notably, the company understands the fact that a word processor crosses applications categories that a data processor cannot.

APPENDIX D: DEFINITIONS

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BATCH SERVICES This includes data processing performed at vendor's sites of user programs and/or data which are physically transported (as opposed to electronically by telecommunications media) to and/or from those sites. Data entry and data output services, such as keypunching and COM processing, are also included. Batch services include those expenditures by users which take their data to a vendor site which has a terminal connected to a remote computer used for the actual processing.

COMPUTER SERVICES Those services provided by vendors which perform data processing functions using vendor computers, or assist users to perform such functions on their own computer.

DATA BASE MANAGEMENT SYSTEM A generalized computer program which handles the mechanics of storing, updating and accessing data for multiple applications. This definition does not include file management systems which are designed primarily for single applications (e.g., MARK IV, EASTRIEVE).

DISTRIBUTED DATA PROCESSING (DDP)

- INPUT was unable to find a consensus among both users and vendors as to a definition of DDP. It appears to be a concept that is uniquely structured to satisfy individual vendor and user requirements.
- Nonetheless, as a result of extensive work in this area, INPUT offers the following hybrid definition:

- . "Distributed processing is the deployment of programmable intelligence in order to perform data processing functions where they can be accomplished most effectively, through the electronic interconnection of computers and terminals, arranged in a telecommunications network adapted to the user's characteristics."

ELECTRONIC MAIL A range of services which transmit documents consisting of text and graphic material to be read by a person - the quality of the document will be high.

END USER May buy a system from the hardware supplier(s) and do its own programming, interfacing and installation. Alternately, it may buy a turnkey system from a systems house or hardware integrator.

GENERAL PURPOSE COMPUTER SYSTEMS A computer designed to handle a wide variety of problems; includes machine room peripherals, systems software and small business systems.

INFORMATION PROCESSING Data processing as a whole including use of business and scientific computers.

INSTALLED BASE Cumulative number or value (cost when new) of computers in use.

MICROCOMPUTER Combines all of the CPU, memory and peripheral functions of a computer on a chip of silicon. It may be sold in an integrated circuit package or with the addition of more memory and peripheral circuits packaged on a board of a console. Eight bit computer on a chip used as a component.

MINICOMPUTER Usually a 12 to 16 bit computer which is provided with limited applications software and support and represents a portion of a complete, large system.

PERIPHERALS Includes all input, output and storage devices, other than main memory, which are locally connected to the main processor and are not generally included in other categories, such as terminals.

PERSONAL SYSTEM OR PERSONAL COMPUTER (see SMALL COMPUTER SYSTEM.)

SMALL COMPUTER SYSTEM, for the purposes of this study, is a system that sells in a minimally useful configuration for less than \$15,000. It is capable of operating in a standalone mode, but it may also operate in a network. The configuration includes a CPU with memory, a display unit, a printer and some external storage. The external storage is usually floppy disk but can be a cassette tape of any variety. The system is used in a business environment as an aid in performing one's job. It is not used in process control, process automation, dedicated word processing or dedicated data entry.

PROCESSING SERVICES

- Processing services encompass processing services facilities management, remote computing services and batch services. They are categorized by type of services bought by users as follows:
 - Function Specific services are the processing of applications that are targeted to specific user departments (e.g., finance, personnel, sales) but cut across industry lines. Most general ledger, accounts receivable, payroll and personnel applications fall into this category. General purpose tools such as financial planning systems, linear regression packages and other statistical routines are also included in this category. However, when the application or tool is designed for specific industry usage, then the service is industry specific.
 - Industry Specific services provide processing for particular functions or problems unique to an industry or industry group. The software is

provided by the vendor either as a complete package or as an applications "tool" which the user employs to produce a unique solution. Specialty applications can be either business or scientific in orientation; data base services, where the vendor supplies the data base and control access to it (although it may be owned by a third party), are also included under this category. Examples of industry specialty applications are: seismic data processing, numerically-controlled machine tool software development, and demand deposit accounting.

- Utility services are those where the vendor provides access to a computer and/or communications network with basic software that enables any user to develop its own problem solution or processing system. These basic tools include terminal handling software, sorts, language compilers, data base management systems, information retrieval software, scientific library routines and other systems software.

USE OF PROCESSING SERVICES

- Processing can be categorized by use as follows:
 - Transaction Processing indicates those services where the primary or predominant purpose of the application is to process transactions, usually in a highly repetitive fashion. Most business accounting fits into this category. Payroll, accounts receivable, order entry, portfolio accounting and inventory control are all good examples of transaction processing.
 - Information Analysis services are processing services where the primary or predominant purpose of the application is to convert data into information through the use of mathematical, statistical or financial

analysis tools that readily and easily display the results in report or graphical form. The tools may be rapidly adapted to address a variety of nonrepetitive problems. These tools are often in the areas of financial analysis, marketing, planning and statistical analysis. Many of the techniques incorporated have their origins in scientific and engineering applications, which also generally fall within this category.

- User Data Base Management services are processing services where the primary or predominant purpose of the application is to organize and maintain a data base of user information in a manner that facilitates its rapid and efficient retrieval and display according to user-defined parameters, either in ad hoc or fixed form.
- Vendor Data Base services are processing services where the primary or predominant purpose of the application is to retrieve and/or process data supplied by the vendor who controls access to it (although it may be owned by a third party). There are two modes of delivery of this service:
 - Inquiry data base services provide a means of selection and retrieval of data only. They neither provide for, nor usually allow for, the subsequent processing of the data. Stock market statistics, news services and bibliographic data bases are commonly offered in this mode.

PROFESSIONAL SERVICES

- This category is made up of services related to EDP, including professional services facilities management, system design, custom/contract programming, consulting, education and training. Services are provided on the basis of:

- Time and Materials - The billing rate is measured in units of time, rather than actual costs.
- Fixed Price - A firm price is agreed upon for a defined piece of work.
- Cost Plus Fee - The billing rate depends on actual costs plus a fixed fee.
- Professional Services Facilities Management is the management of all or a significant part of a user's data processing functions under a long-term contract (not less than one year). To qualify as professional services facilities management, the contractor must directly plan and control as well as operate the client's facility where the computers are owned by the client. Simply providing resources, even though under a long-term contract, does not necessarily qualify as professional services facilities management.

SOFTWARE PRODUCTS

- This category includes user's purchase of applications and systems packages for use on in-house computer systems. Included are lease and purchase expenditures, as well as fees for work performed by the vendor to implement and maintain the package at the user's site(s). Fees for work performed by organizations other than the package vendor are counted in professional services. There are several subcategories of software products:
 - Application Products are software which perform processing to serve user functions. They consist of:
 - Cross-industry products, which are used in multiple user industry sectors. Examples are payroll, inventory control and financial planning.

- Industry-specialized products, which are used in a specific industry sector such as banking and finance, transportation or discrete manufacturing. Examples are demand deposit accounting and airline scheduling.
- System Products are software that enable the computer/communications system to perform basic functions. They consist of:
 - System operations products, which function during applications program execution to manage the computer system resource. Examples include operating systems, DBMS, communication monitors, emulators and spoolers.
 - System utilization products, which are used by operations personnel to utilize the computer system more effectively. Examples include performance measurement, job accounting, computer operations scheduling and utilities.
 - System implementation products, which are used to prepare applications for execution by assisting in designing, programming, testing and related functions. Examples include languages, sorts, productivity aids, data dictionaries, report writers, project control systems and retrieval systems.

TURNKEY SYSTEMS

- o A turnkey system is a combination of hardware and software integrated into a total system designed to fulfill the processing requirements of an application (or applications) for a user.

APPENDIX E: QUESTIONNAIRE

ALTERNATIVES FOR APPLICATION SOFTWARE DEVELOPMENT

1. Do you sell packaged application software for small computer systems (hardware in the < \$15,000 range)?

_____ Yes

_____ No

- A. If no, do you sell a turnkey system with the hardware component in the above price range?

_____ Yes

_____ No

If no, TERMINATE INTERVIEW.

2. Which of the following do you employ in distributing your product in the U.S. market? Please rank their importance.

| <u>EMPLOY</u> | <u>RANK</u> |
|-----------------------------|-------------|
| _____ Direct Sales Force | _____ |
| _____ Distributor | _____ |
| _____ Direct Mail | _____ |
| _____ Advertising | _____ |
| _____ OEMs | _____ |
| _____ Computer Manufacturer | _____ |
| _____ Other (specify) _____ | _____ |
| _____ _____ | _____ |

3. Do you currently have installations of your products outside the U.S.?

☐ Yes

☐ No

A. If yes, where?

☐ Europe

☐ Middle East

☐ Japan

☐ South America

☐ Other (Specify) _____

If No, Go to 5.

B. How do you market your products outside the U.S.?

☐ Sell from U.S. offices only.

☐ Have foreign sales offices.

☐ Use a foreign distributor.

☐ Rights sold to a foreign firm

☐ Other (Specify) _____

4. What percent of your total revenues comes from foreign sales?

☐ %

5. Do you feel there are special problems in distributing application software internationally?

☐ Product enhancement

☐ Product maintenance

☐ Product support

☐ Product customization

☐ Other (Specify) _____

Please comment: _____

6. Would you consider licensing the application software to a foreign manufacturer for distribution on their hardware?

☐ Yes

☐ No

- A. Would you allow distribution in:

☐ USA

☐ Europe

☐ Japan

☐ Anywhere

☐ Other _____

7. Please describe the application software you offer, including average price and hardware system. (vendor and model)

| | <u>APPLICATION</u> | <u>APPLICATION SOFTWARE PRICE</u> | <u>HARDWARE</u> | <u>PRICE</u> | <u>TURNKEY SYSTEM COMBINED PRICE</u> |
|----|--------------------|---|-----------------|--------------|--|
| A. | _____ | _____ | _____ | _____ | _____ |
| B. | _____ | _____ | _____ | _____ | _____ |
| C. | _____ | _____ | _____ | _____ | _____ |
| D. | _____ | _____ | _____ | _____ | _____ |
| E. | _____ | _____ | _____ | _____ | _____ |
| F. | _____ | _____ | _____ | _____ | _____ |
| G. | _____ | _____ | _____ | _____ | _____ |

8. What were your two most recent fiscal year revenues?

YR. _____ \$ _____ OR UNDER \$500K _____

YR. _____ \$ _____ \$500K - 1 MILLION _____

\$1 - 3 MILLION _____

\$3 - 10 MILLION _____

\$10 - 15 MILLION _____

\$15 MILLION _____

Growth rate over previous year? _____

